

CLAIMS

1. A method of preparing substantially purified DNA, without the use of nucleases or proteases, by adding an effective amount of a compaction agent to a lysate to precipitate, from said lysate, DNA having a content of RNA of less than 3% by weight.
2. A method for the production of purified DNA having a content of RNA of less than about 3% by weight, comprising in combination the following steps:
- A. lysing a cell mass to liberate the nucleic acids
 - B. optionally precipitating some additional moieties.
 - 10 C. optionally adjusting the ionic strength and/or plasmid concentration and;
 - D. precipitating a substantial fraction of the DNA away from contaminating RNA and protein by addition of an effective amount of a compaction agent.
3. A composition of matter comprising DNA, substantially free of added nucleases, and containing less than about 3% by weight RNA
- 15 4. A method of treatment of a mixture comprising desired RNA product and contaminating DNA comprising mechanical lysis of the mixture in the presence of a compaction agent to precipitate at least a portion of the contaminating DNA.
- 20 5. A composition of Claim 3 comprising a plasmid DNA encoding proteins for use as a vaccine.

6. A method for making a biochemical assay comprising hybridizing a labeled probe to a target and thereafter precipitating the probe and the target, leaving the unhybridized probe substantially in solution.

7. A method according to Claim 2 for producing ribosomal RNA,
5 chromosomal DNA, plasmid DNA, aptamers, artificial RNA, or mRNA or other natural or synthetic nucleic acids.

8. The method of Claim 1 in which the addition of the compaction agent comprises the addition of two or more different mixed compaction agents whereby improved separation efficiency results.

10 9. A method according to Claim 1 additionally comprising stripping the compaction agent by a stripping method selected from the group comprising high salt addition and/or a pH shift.

15 10. A composition for the recovery of DNA comprising a mixture of combined reagents, one of which lyses and one of which precipitates DNA to clarify a cell mass.

20 11. A method according to Claim 2 additionally comprising a technique selected from the group consisting of: use of French cell press, addition of nonionic detergent, lysozyme addition, microfluidizer, freeze-thaw or any other relatively low ionic strength lysis technique to produce nucleic acid free lysates for later protein recovery.

12. A method according to Claim 1 comprising simultaneous application of the method in parallel mini-prep procedures for a plurality of cell masses.

13. A method of assay comprising precipitating a labeled probe while it is hybridized to a target.

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14. A method according to Claim 2 additionally comprising a further separation step comprising one or more techniques selected from the group consisting of: precipitation and resuspension, filtration and adsorption for production of more pure product.

10 15. A method according to Claim 2 comprising addition of about 0.001 to 20 mM of a compaction agent selected from the group consisting of: basic polypeptides, polyamines, trivalent and tetravalent metal ions, or manganese chloride.

15 16. The method of Claim 2 wherein the source of the lysate comprises gram-positive bacteria, yeast, eukaryotes, synthesized nucleic acids, Archaea, bacteria, protozoa, phages, other viruses, human cells, body fluids, mixtures of cells, tissues, or environmental samples.

20 17. A method of performing a bioassay or separation comprising compaction precipitation, wherein a tagged probe (e.g. a fluoresceinated probe) is added to a solution containing its target, a double stranded nucleic acid is formed and this new structured hybrid nucleic acid is then selectively precipitated while the unhybridized single stranded probe is substantially left in solution.

18. A composition of Claim 3 comprising less than 0.1 Units endotoxin per microgram plasmid DNA (EU/ug or IE/ug).

19. A biotech kit comprising compaction agent and other reagents and apparatus designed for the purification of nucleic acids from lysates or synthetic solutions.

20. Each invention described herein.

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Table A

<u>Parameter</u>	<u>Units</u>	<u>Preferred</u>	<u>Most Pref.</u>
Cell Mass		Archaea eukaryotes bacterial, Gram-negative Gram-positive phage, yeast	Gram-neg
Product:		DNA, RNA, Assay NA-binding protein enzymes, cosmids, YACs, Plasmid	plasmid DNA
Compaction Agent:		basic polypeptides (e.g. polylysine), polyamines (e.g. protamine, spermidine, spermine, putrescine, cadaverine, etc.), trivalent and tetravalent metal ions (e.g. hexammine cobalt, chloropentammine cobalt, chromium (III)), netropsin, distamycin, lexitropans, DAPI (4',6 diamino 2-phenylindol), berenil, pentamidine, manganese chloride. Most preferred: hexammine cobalt, spermine and spermidine	
CA Conc. mM		0.02-20	0.05-10

Lysing Agent: detergent nonionic det. BPER for RNA;

(alkaline lysis is m.p. for plasmidDNA)

“ “ Conc.:wt% 0.5-2 .05-.5

pH: varies 6-8 7

5 Ionic Strength:mM 0-200 0-50

(Before Compaction)

Endotoxin Level >0.3 EU/mL >0.1 EU/mL

FOIA b 7 - Excluded